

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
10 February 2005 (10.02.2005)

PCT

(10) International Publication Number
WO 2005/012371 A3

(51) International Patent Classification⁷: **C08F 10/00**,
2/34, 4/654, 4/655

(21) International Application Number:
PCT/US2004/010572

(22) International Filing Date: 7 April 2004 (07.04.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/469,663 12 May 2003 (12.05.2003) US
60/469,664 12 May 2003 (12.05.2003) US

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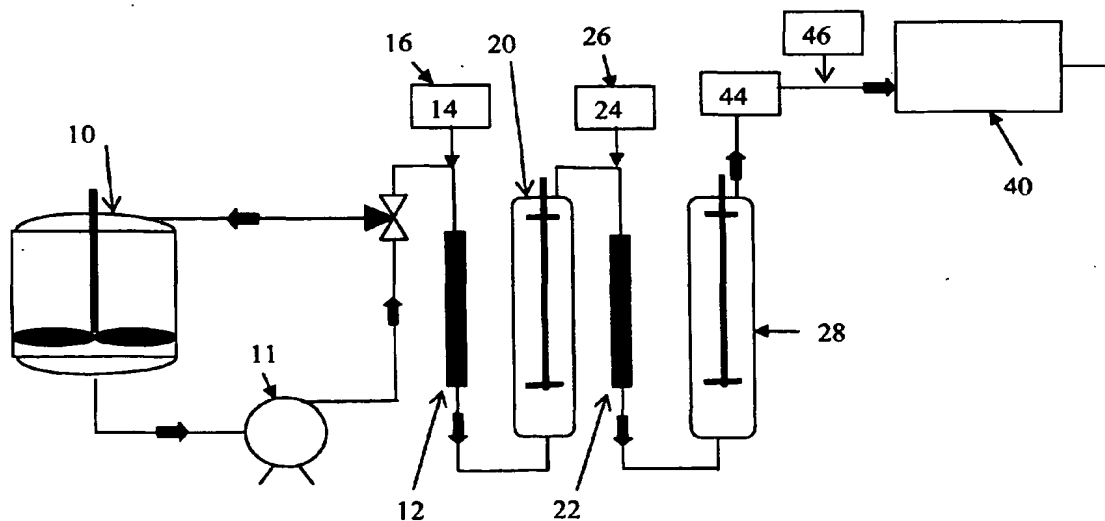
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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,
GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,

[Continued on next page]

(54) Title: PROCESS FOR CONTROL OF POLYMER FINES IN A GAS-PHASE POLYMERIZATION



(57) Abstract: A gas phase polymerization process comprising: (1) preparing a solution of a catalyst precursor comprising a mixture of magnesium and titanium compounds, an electron donor and a solvent; (2) adding a filler to the solution from step (1) to form a slurry; (3) spray drying the slurry from step (2) at a temperature of 100 to 140 °C to form a spray dried precursor; (4) slurring the spray dried precursor from step (3) in mineral oil, (5) partially or fully pre-activating the catalyst precursor by contacting the slurry of (4) with one or more Lewis Acids, and (6) transferring the partially or fully activated precursor from step (5) into a gas phase reactor in which an olefin polymerization reaction is in progress.



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:

6 May 2005

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/010572

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C08F10/00 C08F2/34 C08F4/654 C08F4/655

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C08F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 783 007 A (UNION CARBIDE CHEMICALS & PLASTICS TECHNOLOGY CORPORATION) 9 July 1997 (1997-07-09) page 5 - page 9	1-11
X	WO 01/05845 A (UNION CARBIDE CHEMICALS & PLASTICS TECHNOLOGY CORPORATION) 25 January 2001 (2001-01-25) page 20 - page 35	1-11
X	US 5 290 745 A (JORGENSEN ET AL) 1 March 1994 (1994-03-01) cited in the application column 9 - column 12	1-11
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

17 February 2005

Date of mailing of the international search report

04/03/2005

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/010572

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 187 866 B1 (JORGENSEN ROBERT JAMES ET AL) 13 February 2001 (2001-02-13) cited in the application column 12 - column 17	1-11
A	EP 1 285 934 A (NOVA CHEMICALS S.A) 26 February 2003 (2003-02-26) paragraph '0047!	1-11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/010572

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0783007	A	09-07-1997	AU 708276 B2	29-07-1999
			AU 7653996 A	10-07-1997
			BR 9700007 A	10-11-1998
			CA 2193758 A1	05-07-1997
			EP 0783007 A2	09-07-1997
WO 0105845	A	25-01-2001	US 6617405 B1	09-09-2003
			AU 6096500 A	05-02-2001
			BR 0012428 A	02-04-2002
			CA 2378957 A1	25-01-2001
			EP 1200483 A1	02-05-2002
			JP 2003505541 T	12-02-2003
			WO 0105845 A1	25-01-2001
US 5290745	A	01-03-1994	AU 4451593 A	17-02-1994
			BR 9303323 A	22-03-1994
			CA 2103632 A1	11-02-1994
			CN 1085915 A	27-04-1994
			CZ 9301628 A3	16-02-1994
			EP 0584626 A2	02-03-1994
			FI 933505 A	11-02-1994
			HU 68489 A2	25-04-1995
			JP 7292031 A	07-11-1995
			NO 932833 A	11-02-1994
			PL 300014 A1	21-02-1994
			ZA 9305777 A	08-03-1994
US 6187866	B1	13-02-2001	AU 3647300 A	07-12-2000
			BR 0002576 A	02-01-2001
			CA 2311115 A1	04-12-2000
			EP 1057834 A1	06-12-2000
			JP 2001019707 A	23-01-2001
EP 1285934	A	26-02-2003	US 6825293 B1	30-11-2004
			BR 0203612 A	24-08-2004
			BR 0203850 A	20-05-2003
			CA 2397401 A1	20-02-2003
			CN 1406989 A	02-04-2003
			EP 1285934 A1	26-02-2003